

REMARKS/ARGUMENTS

I. Introduction:

Claims 1, 8, 45, 53, 57, 62, 64, and 65 have been amended and new claims 75-90 have been added herein. With entry of this Amendment, claims 1-90 will be pending.

II. Drawings:

Figures 1A, 1B, and 5 have been amended to include a "Prior Art" legend as requested by the Examiner. The revised drawings and redlined drawings indicating the changes are attached hereto.

III. Claim Objections:

Claim 8 has been amended to replace the phrase "so that a size" with the phrase "so that the size", as requested by the Examiner.

IV. Claim Rejections Under 35 U.S.C. 112:

Claims 1, 53, and 57 have been amended to replace the phrase "a preamble" or "an Ethernet preamble" with "the preamble" or "the Ethernet preamble", respectively, as requested by the Examiner.

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Claim 62 has been amended to replace the phrase “error protection field” with “error detection field”, which has proper antecedent basis.

As amended, claims 1, 53, 57, and 62 are believed to comply with 35 U.S.C. 112.

V. Claim Rejections Under 35 U.S.C. 102:

Claims 1, 2, 10-13, 16, 24, 25, 28, 32-35, 39, 40, 45, 53, 56, 57, 65, and 70 stand rejected under 35 U.S.C. 102(e) as being anticipated by “Generic Format for Carrying Ethernet MAC Frames over SONET”, G. Huang, October, 1999 (Huang).

Haung discloses a generic mapping format for carrying Ethernet over SONET in either point-to-point or ring topologies. Network management information is contained in the SONET header. The Ethernet LAN service is thus carried directly on the SONET transport network. The frame format is designed for carrying frames between, for example, two points in a SONET transport network. Haung removes the preamble and replaces it with a different and longer header with different packet delineation scheme (Fig. 1). As shown in Fig. 4, for example, the preamble and SFD, which are 8 bytes, are replaced with a core header having 10 bytes. As described in both examples at step 5, the frame is mapped into an STS payload. (STS stands for Synchronous Transfer Signal and is the electrical specification for the various levels of the SONET hierarchy).

Claim 1 is directed to a method for conveying network management information within a network. The method generally comprises: receiving an Ethernet packet at a network element; modifying the Ethernet packet by inserting a header in place of the preamble within the packet; and transmitting the modified packet from the network element. The header is configured to provide support for network management. Claim 1 has been amended to clarify that the Ethernet frame is preserved when the header is

inserted in place of the preamble and that the Ethernet frame is transmitted from the network element.

The mapping format disclosed by Huang does not replace the Ethernet preamble with a header while maintaining the Ethernet frame nor does it transmit an Ethernet frame from a network element. In contrast, Huang maps a packet into a SONET frame payload and does not preserve Ethernet packet structure. Data is transported using SONET transmission systems, which are different and more complex than Ethernet systems. This results in expensive processes to set up equipment and services for transmitting data from LANs onto metro networks. The core header of Huang is not in an Ethernet frame, it is simply a field in a SONET frame.

Applicants' invention is particularly advantageous in that it enables network management without the intervening SONET layer, thus increasing management and bandwidth efficiencies. Since the SONET overhead, termination, and equipment is eliminated, substantial savings in equipment and operational costs are provided. Applicants' invention, as set forth in claim 1, provides Ethernet the management capabilities available in SONET networks. The standard Ethernet packet is modified to provide management capabilities and eliminate the need for the SONET layer in packet over optics networks. The standard Ethernet packet includes a start of frame field, preamble, data field, and CRC. Since the header of applicants' invention replaces only the preamble field, all of the other fields remain intact in the Ethernet packet and no overhead is introduced relative to packet. This allows a standard Ethernet packet to be modified to add information upon transmission while the received packet is converted to a standard Ethernet packet with the original preamble, by stripping the information upon receipt. Applicants' invention further allows for integrated network management in that one connection can reach all network elements within a given architecture and separate links are not required for each network element. Companies and service

provides therefore, do not need to invest time, money and resources in translating LAN data into SONET networks, as is required in the mapping format of Huang.

Accordingly, claim 1, as amended, is submitted as not anticipated by Huang. Claims 2-40 and new claims 75-79, depending either directly or indirectly from claim 1, are submitted as patentable over Huang for the reasons discussed with respect to claim 1.

Claims 75 and 76 are further submitted as patentable over Huang, which does not maintain the start of frame field or the interpacket gap of the Ethernet frame. As previously discussed, Huang inserts fields into a SONET frame for transport over a SONET system, thus there is no need to preserve the Ethernet frame structure including the start of frame field or interpacket gap. As shown in Fig. 4 of Huang, the interpacket gap is translated to an idle field.

Claim 77 is further submitted as patentable because Huang does not disclose receiving an Ethernet packet at a network element configured for receiving and transmitting Ethernet frames. Applicants' invention allows devices to connect directly to an Ethernet link, thus providing reduced costs. The Huang format does not allow devices to connect directly to Ethernet devices, but instead require packets to pass through a SONET device.

As discussed above, the mapping format of Huang includes SONET overhead since the core header is inserted into a SONET frame. Therefore, new claim 78 is submitted as patentable over Huang.

Claim 79 is further submitted as patentable over Huang because it does not disclose operations, administration, and maintenance information contained within an Ethernet frame. With respect to management information, the Examiner refers to the

congestion notification field of Huang. However, this field is located within the SONET frame.

Claim 45 is directed to an Ethernet network system for conveying network management information. The system includes a network element generally comprising a port controller and a network element controller coupled to the port controller and operable to generate and consume network management information. The port controller is operable to receive a packet and modify the packet by inserting a header in place of the preamble within the packet. The header is configured to provide support for network management. Claim 45 has been amended to clarify that the packet maintains the Ethernet frame. Claim 45 is submitted as not anticipated by Huang for the reasons discussed above with respect to claim 1. Moreover, Huang does not disclose a port controller operable to receive and modify an Ethernet packet.

Claims 46-52 and new claim 80, depending either directly or indirectly from claim 45, are submitted as patentable for the same reasons as claim 45.

Claim 53 is directed to a computer program product for conveying network management information within a network. The product includes code that modifies an Ethernet packet by inserting a header in place of an Ethernet preamble, code that transmits the modified packet from a network element, and a computer-readable medium for storing the codes. Claim 53 has also been amended to clarify that the header is inserted in place of the Ethernet preamble while preserving the Ethernet frame and is submitted as not anticipated by Huang for the reasons discussed above with respect to claim 1.

Claims 54-56 and new claims 81-83, depending directly from claim 53, are submitted as patentable for the same reasons as claim 53. Moreover, claims 81-83 are submitted as patentable for the reasons discussed above with respect to claims 75-77, respectively.

Claim 57 is directed to a system comprising a processor that executes a program for modifying an Ethernet packet to provide OAM capabilities. The program includes code that modifies an Ethernet packet by inserting a header in place of an Ethernet preamble within the packet, code that transmits the modified Ethernet packet over a path within a network, and a computer readable storage medium having the program stored thereon. Claim 57 has been amended to clarify that the Ethernet frame is maintained when the header is inserted in place of the Ethernet preamble and is submitted as not anticipated by Huang for the reasons discussed above with respect to claim 1. Moreover, Huang does not disclose providing OAM capabilities, as noted by the Examiner at paragraph 58 of the Office Action dated March 30, 2004.

Claim 65 is directed to a system for conveying network management information in an Ethernet system. The system generally comprises means for receiving an Ethernet packet at a network element, means for modifying the preamble of the Ethernet packet to support network management, and means for transmitting the modified Ethernet packet. Claim 65 has been amended to clarify that the Ethernet frame is maintained when the preamble of the Ethernet packet is modified and is submitted as not anticipated by Huang for the reasons discussed above with respect to claim 1.

VI. Claim Rejections under 35 U.S.C. 103:

Claims 17, 18, 26, 27, 29-31, 36, 37, 39-44, 48-51, 54, 66-69, 72, and 73 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Huang.

Claims 17, 18, 26, 27, 29-31, 36, 37, 39-40, 48-51, 54, 66-69, 72, and 73 are submitted as nonobvious over Huang for the reasons discussed above.

Claim 18 is further submitted as patentable over Huang which does not show or suggest packet type information that identifies if the Ethernet packet has been modified. The Examiner states that it would have been obvious in Huang to identify that the Ethernet packet has been modified. However, Huang does not transmit the Ethernet packet, instead header information is inserted into a SONET frame. Therefore, there would be no reason for Huang to specify information about an Ethernet packet.

With regard to claims 29 and 30, applicants submit that it would not be obvious to insert a defect indicator or an automatic protection switching subchannel within the header of Huang. Since Huang transmits a SONET frame, there is no reason to insert this information within the header, which is merely used to transmit Ethernet information. Furthermore, there is no suggestion in Huang to switch a receiving node to a backup path upon transmitting a defect indicator, as required by claim 30.

Claim 36 is further submitted as nonobvious over Huang which does not show or suggest a network management station having access to a plurality of network elements via a header. A management station would obtain management information regarding network elements via other fields of the SONET frame of Huang rather than the core header, since management information is already contained within the SONET frame and does not need to be provided via the core header.

Claim 41 is directed to a method for supporting management of a network. The method includes receiving a modified Ethernet packet at a network element, replacing a header in the modified packet with a preamble within the packet to create an Ethernet packet, and transmitting the Ethernet packet from the network element. The header is configured to provide support for network management.

As discussed above, Huang is directed to a generic mapping format for carrying Ethernet over SONET. Huang does not teach receiving a modified Ethernet packet with a header configured to provide support for network management, or replacing the

header with a preamble and transmitting the Ethernet packet. Huang transports data using SONET transmission systems. Information from an Ethernet packet is used to insert information into a field in a SONET frame. The SONET frame is then transmitted, not the Ethernet packet.

In rejecting claim 41, the Examiner states that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow an Ethernet packet which has been previously modified to provide support for network management to be converted back into a standard Ethernet packet by replacing the management header with a standard Ethernet preamble." However, this is not what the mapping format of Huang is used for. Huang does not modify an Ethernet packet. Instead Huang inserts a header into a SONET frame which already contains management information. The SONET frame of Huang cannot be converted back into a standard Ethernet packet by replacing the management information with a standard Ethernet preamble. A new Ethernet packet would have to be generated.

Accordingly, claim 41 is submitted as nonobvious over Huang. Claims 42-44 and new claims 84-90, depending either directly or indirectly from claim 41, are submitted as patentable for the same reasons as claim 41.

Claims 3-7, 14, 15, 19-21, 52, 55, 58, 60-64, and 71 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of U.S. Patent No. 6,498,667 (Masucci et al.).

Masucci et al. disclose a method for transmitting packets over passive optical networks. The method provides for aggregation of multiple broadband services through the transmission of packets and cells simultaneously over a passive optical network. Data is transmitted downstream from a central terminal to remote terminals in successive downstream frames and upstream data is transmitted from the remote terminals to the central terminal in upstream timeslots over an upstream network. The

downstream data includes downstream packet data and downstream ATM cell data and upstream data includes upstream packet data and upstream ATM cell data. The system includes a WAN interface which sources and sinks one or more SONET data streams that interface with the WAN, and physical interface devices are standard SONET devices. The downstream frame includes OAM&P messages which occupy a 24-byte field in the frame.

Applicants respectfully submit that there is no suggestion to combine the teachings of Huang with Masucci et al. to produce the claimed invention. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. The Huang reference is directed to a mapping format for carrying Ethernet frames over SONET. The system of Huang carries Ethernet over SONET by mapping a modified Ethernet packet into a SONET frame which already contains OAM information. In contrast, the Masucci et al. patent is concerned with providing both packet-based and cell-based broadband services over a high bandwidth network. In order to aggregate multiple broadband services, Masucci et al. provide a downstream frame and an upstream frame. The frame format includes an OAM&P field, similar to the field provided in SONET frames.

Even assuming, for the sake of discussion, that one would look to Masucci et al. to find an OAM&P format for Huang, this would not necessarily lead to Applicants' invention. The OAM&P would still be contained within a SONET frame and transmitted from a network element as a SONET frame, rather than an Ethernet frame, as required by claim 1.

Accordingly, claims 3-7, 14, 15, 19-21, 52, 55, 58, 60-64, and 71 are submitted as patentable over Huang and Masucci et al.

Furthermore, in rejecting claim 3 the Examiner states that it would be advantageous to add OAM&P fields to the header disclosed by Huang. However, Huang is inserting the header into a SONET frame which already contains OAM&P, therefore, there is no need to add OAM&P to the core header. Accordingly, claims 3-7 are submitted as nonobvious over Huang and Masucci et al.

Claims 8, 9, and 59 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of U.S. Patent No. 5,872,920 (Hausman et al.).

Hausman et al. disclose a programmed I/O Ethernet adapter with early interrupts for accelerating data transfer. Figs. 3A and 3B of Hausman et al. illustrate the structure of data packets handled by the adapter. The packet includes a preamble containing a 1-bit INT field which specifies whether there should be an interrupt upon successful completion of a transmission and an 11-bit length field, which specifies the number of bytes of actual unpadded packet data. Prior to transmission of the packet, the preamble is stripped off and replaced with a standard Ethernet preamble.

Applicants respectfully submit that Huang and Hausman et al. do not show or suggest inserting a header in place of the Ethernet preamble that includes the same number or a fewer number of bytes than the preamble of the Ethernet packet. Huang removes the preamble and replaces it with a different and longer header with a different packet delineation scheme. As shown in Fig. 4, for example, the preamble and SFD, which are 8 bytes, are replaced with a core header having 10 bytes. Hausman et al. replace a 1-bit and 11-bit field with the standard Ethernet preamble, rather than replacing the standard Ethernet preamble with a header having the same or fewer number of bytes than the Ethernet preamble, as required by claims 8, 9, and 59.

Moreover, if Huang were limited to 8 bytes in the core header, the header would not include all the required fields. As such, the proposed modification of Huang would

defeat the primary functionality of the Huang system. The law is clear that it would not be obvious to make a modification in such instances.

Applicants' invention is particularly advantageous in that the header is prepended to standard Ethernet packets by replacing a preamble of the Ethernet packet. With respect to claim 9, the header and Ethernet preamble are both 8 bytes in length. The overall size of a modified Ethernet packet is thus the same as a standard Ethernet packet and the header can be inserted into standard Ethernet packets without any change in bandwidth.

Accordingly, claims 8, 9, and 59 are submitted as patentable over Huang and Hausman et al.

Claims 22 and 23 stand rejected under 35 U.S.C 103(a) as being unpatentable over Huang in view of "SONET to Your Desktop", K. Murakami, March 1998 (Murakami).

Murakami is a frame switching technical white paper discussing a MAPOS switch based on the frame switching concept and designed for SONET systems. Murakami fails to remedy the deficiencies of the primary references.

VII. Conclusion:

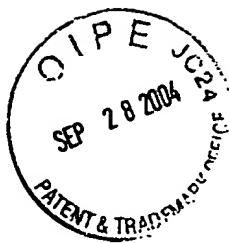
For the foregoing reasons, applicants believe that all of the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned at (408) 446-8695.

Respectfully submitted,



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PACKET OVER SONET

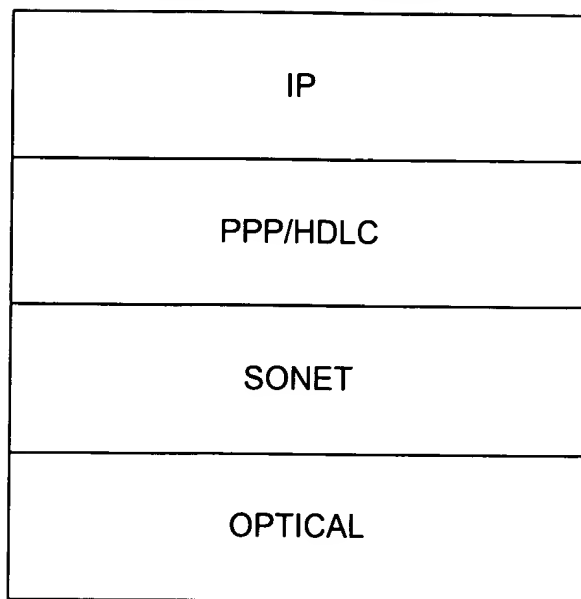


FIG. 1A

Prior Art

ETHERNET OVER SONET

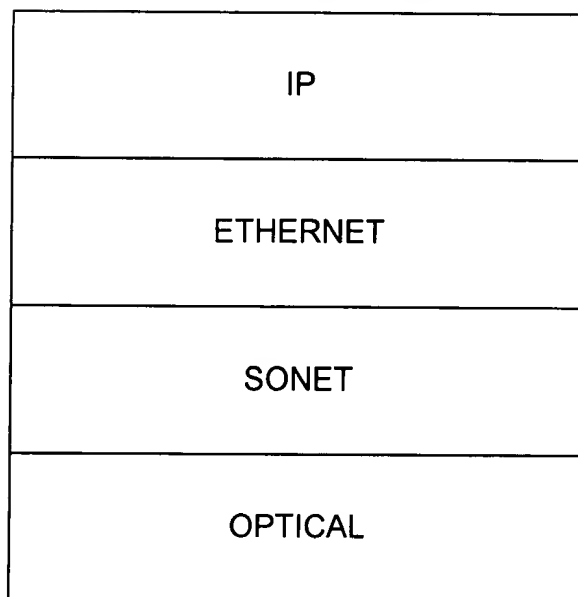


FIG. 1B

Prior Art

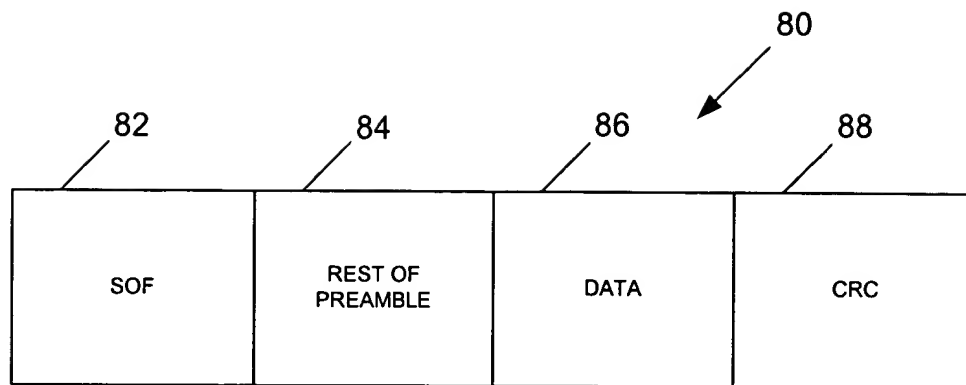


FIG. 5 Prior Art

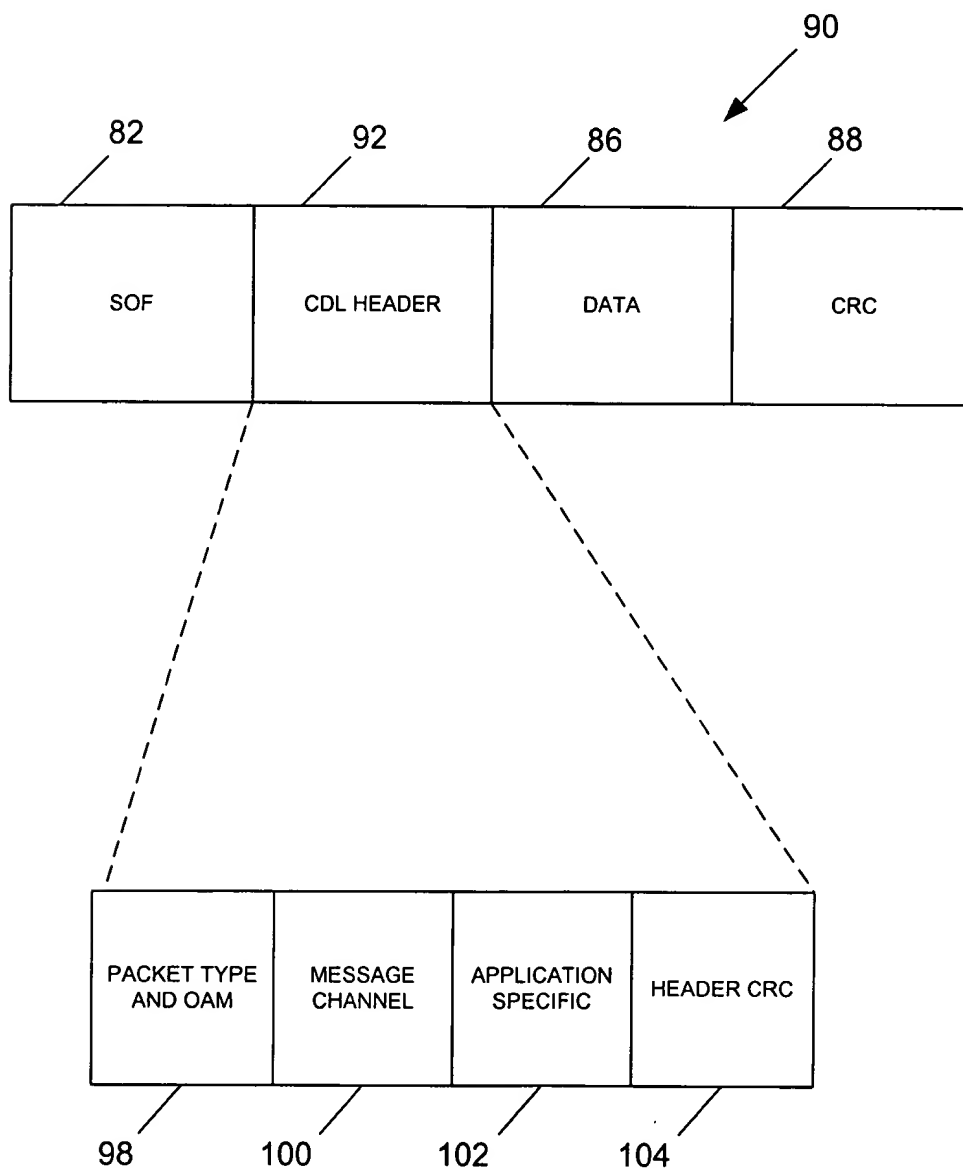


FIG. 6